

## **PTSD and Sensation Seeking**

### **Tendency to Risk Behavior as Protective or Risk Factor**

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## **PTSD AND SENSATION SEEKING**

*The present study analyses the relationship between posttraumatic stress disorder (PTSD) and sensation seeking in a sample of 292 members of the German armed forces. 131 soldiers had been on duty in Afghanistan and were thus at high risk for psychological traumatising. The remaining 161 soldiers were conscripts currently in basic training. The following questionnaires were employed: Need Inventory of Sensation Seeking (NISS), Essen Trauma Inventory, Posttraumatic Symptom Scale and Impact of Event Scale-Revised. The study primarily aimed to examine the sensation seeking disposition of German soldiers in order to establish a baseline for further sensation seeking research. We therefore compared our sample of soldiers with various population samples investigated in other studies using the NISS. A further aim of the study was to examine the connection between psychological traumatising and sensation seeking. The soldiers had a surprisingly low sensation seeking disposition. Subjects with a higher symptom load on trauma associated scales obtained significantly higher sensation seeking scores.*

### **1 INTRODUCTION**

Being a soldier often entails involvement in a number of dangerous activities such as, for example, patrolling in a hostile environment, taking part in combat or driving on potentially mined roads. General engagement in risky activities constitutes one part of a personality trait commonly referred to as sensation seeking. According to Zuckerman, whose work is related to the generation of an important and widely accepted conception of this personality attribute, sensation seeking can be defined as a "trait describing the tendency to seek novel, varied, complex and intense sensations and experiences and the willingness to take risks for the sake of such experience" [1]. The stereotype of a high sensation seeker might engage in a number of risky activities like bungee jumping, freeclimbing or dangerous driving. There are, however many more factors involved in forming the trait than only activities like the ones mentioned above. A trait is defined as a pattern of thoughts, emotions and behavior that is consistent across situations and time. The disposition toward sensation seeking is subject to interindividual variability and is generally measured using standardized questionnaires. The trait can, however, be operationalized in a variety of ways. The Sensation Seeking Scale-V (SSS-V) developed by Zuckerman, Eysenck, and Eysenck [2] represents the most popular measurement instrument. The sensation seeking disposition is determined on the basis of questions pertaining to a number of activities such as mountain climbing, parachute jumping or trying drugs. The trait is thus evaluated strictly at the behavioral level. In contrast, the Need Inventory of Sensation Seeking (NISS, see Roth et al. [3] for detailed description) assesses sensation seeking at the level of a need. The authors propose an operationalization of the trait as the need for new and intensive stimulation. The NISS is not behavior-dependent but rather addresses the frequency of enjoyment in connection with high (e.g. feeling one's own heart beat) or low (e.g. doing or experiencing nothing) arousal sensations.

Psychotherapists dealing with posttraumatic stress disorder (PTSD) and other trauma-related disorders have further proposed that psychological trauma and sensation seeking may be linked [4]. This issue is of particular interest in the context of high risk populations such as soldiers, fire-fighters or police officers, given that these professions are more likely to be chosen by high sensation seekers [5,6,7]. There are, however, very few publications dealing with the association between traumatic illness and sensation seeking [8,9,4]. We would like to point out, that in the authors perception sensation seeking is understood as a trait. There is, however, a different usages of the term found in the literature (e.g.[10] or [11]). Here, Sensation seeking is constricted to (dysfunctional) engagement in high risk activities. The need for stimulation in patients with anxiety disorder is significantly lower than among healthy individuals [12] (in Zuckermann [1]); [13]. The high comorbidity of PTSD and other anxiety disorders [14] may lead to the assumption that traumatized individuals have a lower need for stimulation and thus a lower disposition towards sensation seeking. This is supported by the findings of Neria et al. [8] and Solomon et al. [9] who described higher PTSD symptom levels in low sensation seekers. On the other hand, numerous clinicians

observed an engagement in high sensation-seeking activities in PTSD patients [4]. Wang et al. [4] found higher sensation seeking scores in veterans suffering from PTSD. Compared to controls, individuals with combat experience reached higher sensation seeking scores [15]. Orr et al [16] found no differences in general sensation seeking scores between PTSD patients and controls.

Increased or decreased sensation seeking behavior might be one sign of a posttraumatic illness and therefore an indicator for PTSD. Given, however, that more powerful questionnaires are available in screening for trauma-related illnesses, how can measuring sensation seeking by means of sensation seeking scales be considered useful in diagnosing PTSD? A high tendency to deny the detrimental effects of occupational traumatization on one's own health has particularly been demonstrated in high risk populations [17]. This denial of symptoms may also lead to a false negative screening result. While individuals may appear fully healthy, their effectiveness in the field could well be impaired by the effects of traumatization, including a change in sensation seeking behavior. The ability to evaluate risks associated with a specific situation is of utmost significance in high risk occupations. Danger estimation is known to be highly negatively correlated with sensation seeking disposition [1]. The displacement of sensation seeking disposition to either end of the continuum through traumatization may thus result in incorrect evaluations of situations and consequent changes in the behavior of the affected individual. Such behavioral changes are more likely to be noticed by squad leaders and peers than by troop psychologists and physicians. Therefore, the observations of squad leaders and peers may thus represent an economic and easy to use screening instrument when it comes to early identifying soldiers at risk.

## **2 AIMS OF THE STUDY**

1. Sensation seeking disposition is to be investigated in a sample of German soldiers. The sample was divided into the following subgroups for comparison: soldiers with vs. without foreign assignment, low sensation seekers vs. high sensation seekers and low PTSD symptom level vs. high level. We also intend to compare our sample with a representative sample of the German population and university students.
2. The connection of sensation seeking and psychological trauma is to be examined in an explorative approach.

## **3 METHODS**

### **3.1 Design**

#### **3.1.1 Subjects**

A group of 292 volunteers agreed to take part in a study designed to examine the psychological effects of deployment in Afghanistan (International Security Assistance Force) in comparison with conscripts (131 Soldiers with experience of foreign deployment (AFG), 161 draftees (CON)). See Table 1 for sociodemographic characteristics. German soldiers did not regularly take part in combat-action in Afghanistan, but rather carried out patrolling duties in Kabul and Kunduz and provided reconstruction aid within the country.

#### **3.1.2 Assessment Instruments**

##### *3.1.2.1 Need Inventory of Sensation Seeking (NISS)*

The NISS comprises 17 items rated on a five point Likert scale, assessing sensation seeking as need. Roth et al. [3] developed the NISS on the basis of two separate subscales: Need of Stimulation (NISS-NoS)

with items such as “I like to test my body limits.” or “I sometimes need a certain “kick” in order to feel good.” and Avoidance of Rest (e.g. “It can be pleasant to close yourself off from the outside world”). In line with the authors’ suggestion we only analyzed the 11-item NoS-Scale. The NISS was employed for the following reasons: (1) Soldiers may satisfy their need for stimulation via activities other than those mentioned in the SSS, such as, for example going on patrol, carrying a loaded weapon or engaging in combat training. (2) Since the questionnaire was completed in a group setting, it was considered possible that soldiers could select dangerous activities on the SSS solely in order to impress “peeking” neighbors. We believe that the NISS is less susceptible to this effect. (3) For the purpose of ensuring that the questionnaire was of a reasonable length, we preferred the 17-item NISS to the 40-item SSS-V or the use of both instruments. With Cronbach’s alpha of  $\alpha=.82$  for the NISS-total and  $\alpha=.88$  for the NISS-NoS-Subscale Roth et al. [3] marked the internal consistency as good. Hauffa [18] found a high product-moment-correlation ( $r=.734$ ;  $p<.01$ ) between SSS-V and NISS-total in a sample of 40 German university students. Correlations of the NISS-NoS-Subscale with the SSS-V were not reported.

### 3.1.2.2 *Essen Trauma Inventory(ETI)*

The ETI is a self-rating questionnaire developed by Tagay et al. [19] for the purpose of identifying traumatic life events and posttraumatic disorders. The questionnaire was designed to meet DSM IV-criteria for PTSD (309.81; [20]). It is divided into four parts:

1. A trauma check-list with 15 items.
2. Six questions covering DSM A1+A2 criteria.
3. Twenty-three items assessing posttraumatic symptoms (DSM IV B+C+D-Criterion + peritraumatic dissociation) on a four-point Likert scale.
4. Nine items measuring symptom-related impairment in daily life (DSM IV F-Criterion).

The ETI scores are calculated by adding the item-scores of section three. Sections one, two and four are used to evaluate the trauma and the clinical relevance of the traumatic experience which is mandatory for diagnosing PTSD or ASD. Reliability (Cronbachs alpha:  $\alpha=.95$ ) is excellent [19].

### 3.1.2.3 *Impact of Event Scale – Revised (IES-R)*

Posttraumatic psychological symptoms were assessed using the IES-R [21]. The German version of the Impact of Event Scale-Revised [22] is a 22-item self-rating questionnaire with a four-point Likert scale ranging from "never" to "often". The IES-R consists of three subscales: Intrusion with seven items, Avoidance with eight and Hyperarousal with seven items. Subscale scores are formed by summing subscale items. The global score is calculated using the following formula:

$$X=-(0.02*\text{Intrusion})+(0.07*\text{Avoidance})+(0.15*\text{Hyperarousal})-4.36.$$

Values greater than zero are indicative of PTSD diagnosis. Maercker and Schützwohl [22] found good values for validity and reliability. Cronbach’s alpha ranged from  $\alpha=.90$  (subscale intrusion and hyperarousal) and  $\alpha=.79$  (prisoners) respectively  $\alpha=.71$  (criminality victims) for the avoidance subscale. Using a structured clinical interview (DIPS- Diagnostical interview for psychological disorders) as external criterion showed Kappa=.63, sensitivity=.76 and specificity=.88 for the prisoners and Kappa=.61, sensitivity=.70 and specificity=.89 for criminality victims.

#### 3.1.2.4 Post Traumatic Symptom Scale 10 (PTSS-10)

The PTSS-10 [23] is a brief PTSD screening instrument. We used the German version introduced by Schüffel, Schade, and Schunk [24] and validated by Stoll et al. [25]. The questionnaire contains ten items which assess symptoms such as nightmares, withdrawal, depression or sleep problems. Subjects were required to state the frequency of the respective symptoms over the last few days on a seven-point Likert-scale ranging from one (never) to seven (always). Stoll et al. [25] found optimal sensitivity and specificity values at a 35-point cut off. Internal consistency reached  $\alpha=.91$ .

### 3.2 Procedure

All participants volunteered to take part in the study. The survey was conducted in a group setting. Soldiers were provided with information about the study and received instructions to respect the privacy of the other soldiers.

## 4 RESULTS

In order to test for influences of sociodemographic variables on questionnaire results, regressions and ANOVA were performed. As shown in Table 2, there were no relevant significant associations between the covariates age, sex, family status, rank or education and trauma scores or NoS. The significant connections of gender and PTSS10, partner and PTSS10 as well as family status and NISS-NoS explain only up to four percent of the scales variety and are therefore not considered relevant.

### 4.1 Sensation seeking disposition

The NISS has been applied in very few other population samples. Results are presented in Figure 1. According to the results of Hauffa [18], university students ( $N=40$ , 72.5% female, age: 22-37 years,  $M_{age}=25.2$ ,  $SD=2.6$ , group setting) have a much greater need for stimulation ( $M_{NISS-NoS}=31.7$ ;  $t=-5.17$ ;  $p<.001$ ) than the group of soldiers. In order to compare our sample with representative German data we extracted all male subjects between 18 and 46 years of age ( $N=444$ ) from a representative sample (see Roth et al. [3] for procedures and sociodemographics). The mean NISS-NoS score was significantly higher in the representative sample than in our sample of soldiers ( $M_{NISS-NoS}=28.96$ ;  $t=5.63$ ;  $p<.01$ ).

In light of the fact that university students obtain higher NISS-NoS scores, the hypothesis that education is a powerful moderator of sensation seeking would appear warranted. Nonetheless, a comparison of university students and soldiers with higher education (university entrance qualification or higher,  $n=38$ ;  $m_{NISS-NoS}=25.76$ ;  $SD=9.03$ ) also revealed lower NISS-NoS scores among the soldiers ( $t=-4.05$ ;  $p<.01$ ). Lifestyle (i.e. being a university student versus working full time) might in itself be a more powerful moderator than age or education. This hypothesis has to be verified empirically.

### 4.2 Sensation seeking and psychological trauma

ETI-Values ranged from 0 to 48, PTSS10 scores from 10 to 47 and IES-R- scores from -4.5 to 1.23. The product-moment-correlation indicated a small but significant linear interrelation between trauma scores and the NISS-NoS. R-values were  $r=.192$  for the ETI,  $r=.23$  for the IES-R and  $r=.25$  for the PTSS10. Correlations between trauma scores ranged from  $r=.68$  for PTSS10 and IES-R to  $r=.71$  for ETI and IES-R ( $p<.01$  for all tests, see Table 3 for detailed results).

The CON group reached significantly higher scores on the NISS-NoS ( $m=26.47$  vs.  $m=23.46$ ,  $t=-2.76$   $p<.01$ ) and the IES-R ( $m=-3.75$  vs.  $m=-3.99$ ,  $t=-2.21$   $p<.05$ ) than the AFG group (see Set one in Table 1).



Differences in PTSS10 ( $m=14.65$  vs.  $m=14.37$ ,  $t=-0.39$   $p=.70$ ) or ETI scores ( $m=8.08$  vs.  $m=6.73$ ,  $t=-1.13$   $p=.26$ ) were not significant.

In order to identify differences between high sensation seekers (HSS) and low sensation seekers (LSS), we divided the sample into two groups using a NISS-NoS median split (see Set two in Table1). HSS scored significantly higher on both the PTSS 10 ( $m=13.5$  vs.  $m=15.5$ ,  $t=-3.0$   $p<.01$ ) and the IES-R ( $m=-4$  vs.  $m=-3.7$ ;  $t=-2.51$   $p<.05$ ). Differences between LSS and HSS in ETI-Scores were not significant ( $m=6.7$  vs.  $m=8.3$ ,  $t=0.83$ ,  $p=.169$ ).

The NISS was primarily used in order to establish differences between subjects with high and low symptom levels. A median split (based on ETI total scores) was used to create high versus low symptom load groups (see Set three in Table1). Subjects with higher symptom-scores ("HPTSD") obtained higher scores on the "Need of Stimulation"-Scale ( $m=26.5$  vs.  $m=23.6$ ;  $t=-2.51$ ;  $p=.013$ ) than those with lower scores ("LPTSD"). Both groups, however, remained below the level of the representative sample investigated by Roth et al. [3] ( $\Delta m_{HIGH}=2.49$ ;  $t=2.66$ ;  $p<.01$ ;  $\Delta m_{LOW}=5.39$ ;  $t=5.89$ ;  $p<.01$ ).

## **4 DISCUSSION**

The present paper addressed the sensation seeking disposition of German soldiers and investigated its possible link to psychological traumatization. In light of the lack of literature covering this combination of topics, we decided to adopt an explorative approach.

A surprising result in the present study was the generally very low sensation seeking disposition found among soldiers. We expected soldiers, especially those in the AFG-group, to be characterized by a high sensation seeking disposition. Zuckerman [1] presented data suggesting that soldiers score higher on sensation seeking scales than the average individual but not as high as expedition climbers or parachutists. It is plausible that soldiers' need for stimulation is satisfied by their job. The AFG-group might have received sufficient input during their duty in Afghanistan, and recruits may have been under stress in carrying out their basic training ("boot camp"). A further possible explanation for the low level of sensation seeking found in the present sample is the anchor effect described by Tversky and Kahneman [26]. It is conceivable that soldiers responded to sensation seeking items using their high sensation seeking military peer group as an internal reference for the "average person". In this case, scores would be relativized and would therefore only reach average sensation seeking levels, despite the fact that soldiers might actually have scored higher if they had used non-military persons as an internal reference. A number of the NoS items correspond to the stereotype of a soldier (e.g. enjoying the thrill of combat or going to the physical and psychological limit), while the self-perceptions of the individual might also have subconsciously influenced the response pattern. Schüffel et al. [24] for example, questioned soldiers serving in Cambodia concerning their professional motives and found that sensation seeking was not one of the central reasons for serving abroad. This supports the assumption that the self-perceptions of our sample do not necessarily correspond to popular stereotypes of soldiers. Unwilling to be pressed into this stereotype, participants of the present study may well have described themselves as low sensation seekers.

PTSD-positive Vietnam veterans examined by Orr et al. [16] showed no differences to healthy veterans in global sensation seeking scores measured by the SSS-IV. They scored higher only on the "Boredom susceptibility" subscale. It is, however, well-established that a high comorbidity exists between PTSD and other anxiety disorders [14]. Given that Hammelstein [13] as well as Favarelli et al. [12] found a reduced need for stimulation among patients with anxiety disorders, it can therefore be assumed that PTSD patients also experience a decrease in the need of stimulation. The lower sensation seeking scores in traumatized war captives and veterans [8,9] seem to support this hypothesis. Since correlations do not allow conclusions about cause and effect, one could also reason that a low sensation seeking disposition is a risk factor for the development of PTSD or other anxiety disorders. Low sensation seekers might be more

likely to react with intense fear, helplessness, or horror in high arousal situations, especially in a traumatic situation. Solomon et al. [9] believe, the higher sensation seeking disposition to be a protective factor in soldiers exposed to combat-related stress.

On the other hand, Wang et al. [4] and Wilson et al. [15] found high sensation seeking scores in traumatized soldiers. Since a high sensation seeking disposition, goes along with frequent high arousal situations and lower danger estimation, it is a possible risk factor for experiencing potentially traumatic events and thus for developing PTSD. There are also connections between PTSD and delinquency [27,28] as well as between PTSD and substance abuse [29]. Both have been found to be positively correlated with high sensation seeking scores (see Haapasalo [30] for delinquency and Roth & Herzberg [31] or Wagner [32] for substance abuse). This is in line with our results that also imply either a higher risk in high sensation seekers or an increase in the need for stimulating situations in traumatized individuals. The latter of these two possibilities is an effect, which is also observed by many therapists in patients suffering from PTSD [4].

In total, these contradictory results suggest that psychological traumata could have a substantial influence on the need for sensation seeking (or vice versa). The sensation seeking disposition might thus be displaced to either end of the continuum towards high or low sensation seeking. The literature and the weak differences between "LOW" and "HIGH"-PTSD groups in our study do not allow clear conclusions with respect to the nature of the relationship between trauma and sensation seeking. It is our view that, despite being labeled as a trait, the sensation seeking disposition can be altered by the experience of a severe trauma. However, this hypothesis as well as the role of sensation seeking disposition as a protective or risk factor can only be evaluated with further research.

The present paper addressed the disposition towards sensation seeking in German soldiers and further investigated its connection with psychological traumatization. It helps to understand the complicated nature of the connections between trauma and sensation seeking and contributes to the rare literature in this field of research. The possible clinical significance has also been discussed. In light of the explorative approach adopted, with reference to the results of our research and from a methodological point of view it can be observed that

- the sample is not representative,
- self rating questionnaires have been used,
- we used a group setting,
- no longitudinal design has been applied,
- adequacy of controls and reference groups was limited.

A pre-post design is essential in examining the effect of a foreign assignment on sensation seeking in soldiers. In order to understand the possible links between sensation seeking and PTSD, a sample with higher symptom load, e.g. patients, is recommended. The use of structured clinical interviews would also improve accuracy of further studies.



**Table 1: Subgroup Comparison**

Total			Set one		Set two		Set three	
			AFG	CON	LSS	HSS	LPTSD	HPTSD
Sample size	N	292	131	161	138	145	131	128
Age	Mean	23.68	27.29	20.40	24.05	23.48	23.62	23.61
	SD	5.68	5.98	1.49	6.14	5.31	5.49	5.6
Sex	Male [%]	93.8	97.4	93.2	94.2	93.1	96.2	91.3
Family status	Unmarried [%]	88.6	76.9	100	86.9	89.6	87.8	89.9
	Married [%]	10	21.4	0	13.1	7.6	11.5	7.9
	Divorced [%]	1.4	1.7	0	0.0	2.8	0.8	2.4
	Partner [%]	40	57.3	26.1	44.2	38.2	38.2	41.7
Education	University Entrance [%]	13.7	12.7	14.3	11.6	15.3	15.3	11.8
Military Rank	Enlisted [%]	70.8	39.1	98.8	69.3	71.8	69	70.6
	NCO [%]	26	54.8	1.3	28.5	24.6	27.9	26.2
	Officer [%]	3.1	6.1	0	2.2	3.5	3.1	3.2
NoS	Mean	25.07	23.46	26.47	17.57	32.2	23.57	26.48
	SD	9.05	8.19	9.35	4.05	6.26	9.04	9.22
ETI	Mean	7.64	6.72	8.08	6.73	8.32	1.31	14.1
	SD	9.34	8.71	9.76	8.51	9.59	1.39	9.55
PTSS 10	Mean	14.57	14.37	14.65	13.48	15.52	11.91	17.42
	SD	5.74	5.92	5.78	4.59	6.5	3.1	6.58
IES-R	Mean	-3.85	-3.99	-3.75	-4.0	-3.7	-4.24	-3.42
	SD	.91	.79	.98	.76	1.02	.29	1.13

Sociodemographic data and main results for subgroups extracted from the total sample. Set one refers to soldiers after deployment in Afghanistan (AFG) vs. conscripts (CON), Set two low sensation seekers (LSS) with high sensation seekers (HSS). Set three compares soldiers with low (LPTSD) vs. high (HPTSD) scores on PTSD questionnaires. Mean scores on the Need of Stimulation subscale (Nos) and the different trauma scales (ETI, PTSS-10, IES-R) are presented at the bottom of the table.

**Table 2: Analysis of sociodemographic data**

	Age	Sex	Family Status	Partner	Education	Rank
Test	Regression	ANOVA				
NoS	F = 1.793 p = .193 $\beta$ = -.078	F = .229 p = .633 $R^2$ = .001	F= 4.999 p = .007 $R^2$ = .035	F = .797 p = .373 $R^2$ = .003	F = .260 p = .611 $R^2$ = .001	F = .807 p = .447 $R^2$ = .006
ETI	F = 0.000 p = .992 $\beta$ = -0.001	F =1.149 p = .285 $R^2$ = .004	F=.061 p = .941 $R^2$ = .000	F = 1.827 p = .178 $R^2$ = .007	F = .496 p = .494 $R^2$ = .002	F = .493 p = .611 $R^2$ = .004
PTSS 10	F = .311 p = .578 $\beta$ = -0.033	F =10.964 p = .001 $R^2$ = .037	F=.212 p = .809 $R^2$ = .002	F = 9.802 p = .002 $R^2$ = .034	F = .035 p = .852 $R^2$ = .000	F = .395 p = .674 $R^2$ = .003
IES-R	F = 2.894 p = .090 $\beta$ = -0.106	F =3.176 p = .076 $R^2$ = .012	F=.766 p = .466 $R^2$ = .006	F = 3.214 p = .074 $R^2$ = .012	F = .037 p = .847 $R^2$ = .000	F = .639 p = .529 $R^2$ = .005

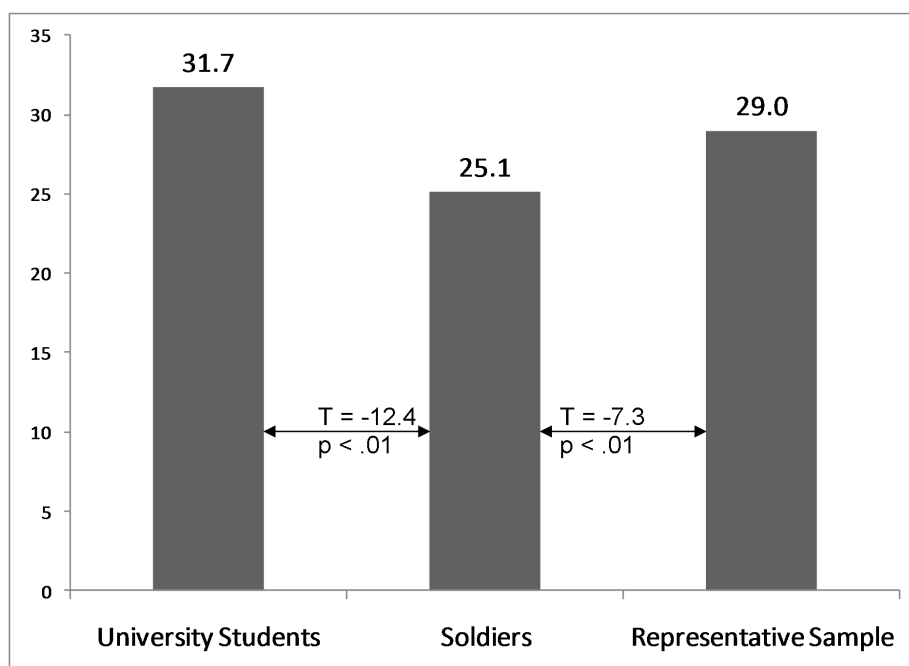
Analysis of the connection of sociodemographic data and Need of Stimulation subscale (NISS-NoS), Essen Trauma Inventory (ETI), Post Traumatic Symptom Scale 10 (PTSS10) and Impact of Event Scale (IES-R).

**Table3: Correlations of trauma scales**

	PTSS10	IES-R	NISS-NoS
ETI	.692**	.712**	.192**
PTSS10		.682**	.246**
IES-R			.230**

Correlations of Need of Stimulation subscale (NISS-NoS), Essen Trauma Inventory (ETI), Post Traumatic Symptom Scale 10 (PTSS10) and Impact of Event Scale (IES-R). \*\*  $p < .01$

**Figure 1: Mean Scores on the Need of Stimulation Scale (NISS-NoS) in different samples.**



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